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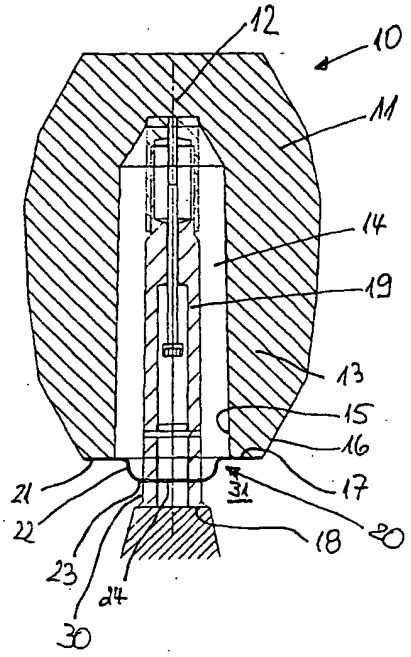
(54) Feeder insert with metallic feeder foot

(57) Feeder insert to be inserted into a casting mould used for casting metals, consisting of a feeder body made of an exothermic and/or insulating material comprising a feeder volume, a metallic annular part being attached to its lower bottom surface facing the mould area forming the cast piece, which itself forms a feeder opening adapted to provide a predetermined breaking point for a feeder residue being formed in the feeder volume, characterized in that the annular part (20) has a hat-shaped form with a collar (21) connected to the bottom surface (17) of the feeder body (11), and a cover surface (23) projecting over a crown (22) to the mould surface (18) and comprising the feeder opening (24).



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Feeder insert with metallic feeder foot

Description

The invention relates to a feeder insert to be inserted into a casting mould used for casting metals, consisting of a feeder body made of an exothermic and/or insulating material comprising a feeder volume, a metallic annular part being attached to its lower bottom surface facing the mould area forming the cast piece, which itself forms a feeder opening adapted to provide a predetermined breaking point for a feeder residue being formed in the feeder volume.

A feeder insert with the above-mentioned features is disclosed in DE 196 42 838 A1. Here, the annular part adhered or clamped to the bottom area of the feeder body is shaped as a planar plate which contains in its center a feeder opening having a smaller diameter than the feeder volume, which forms a predetermined breaking point for the feeder residue remaining in the feeder volume after the casting of the cast piece. This plate consists of a suitable metal which, upon the attack of the hot cast material and of the ignited exothermic feeder material maintains its shape and does not melt. DE 146 42 838 A1

points out that upon the use of the known feeder insert by shaping with the moulding sand or a suitable moulding mixture, a sand layer is or should be formed between the metal plate of the feeder insert and the surface of the mould, in order to form an insulation between the feeder insert and the hot metal surface of the cast piece formed upon casting in the mould cavity.

Compared with a known and alternatively used breaking core between the feeder insert and the surface of the mould the metal plate has the advantage that the feeder opening has approached the mould surface relatively closely. Furthermore, the metal plate, during the shaping of the feeder insert is more resistant against the effective mould pressure as compared to breaking cores, so that the danger of a destruction of the feeder insert during the moulding is reduced. Such destruction should be avoided because otherwise components of the feeder insert are released prior to the casting and during the casting process, and may then get into the cast piece.

However, the known feeder insert has the disadvantage that the formation of a predetermined breaking point by the metal plate does not yet ensure breaking of the feeder residue close to the surface of the cast piece with the necessary operational reliability, so that the finished cast piece must be cleaned which should be avoided. There is the additional disadvantage, in particular due to the pressure exerted during the moulding process, that the metal plate may be detached from the feeder body and may get into the cast piece after taking away the mould from the model.

The invention is therefore based on the task to further improve a feeder insert having the features of the preamble, with regard to the breaking of the feeder residue near the

surface of the finished cast piece, and furthermore to increase the operational reliability of the feeder insert.

The solution of this task including advantageous embodiments and developments of the invention is evident from the contents of the claims which are attached to this description.

Basically, the invention provides that the annular part has a hat-shaped form with a collar connected to the bottom surface of the feeder body and a cover surface projecting over a crown to the mould surface and comprising the feeder opening. The invention has the advantage that the formation of the predetermined breaking point is improved by the hat-shaped design of the metallic annular part according to the invention.

On the one hand, the projecting cover surface of the annular part moves the feeder opening forming the predetermined breaking point closer to the surface of the mould; on the other hand, there are no changes of the structure in the interior of the hat-shaped annular part and the feeder residue formed during the casting process because the liquid metal entering the feeder volume first fills the inner volume of the hat-shaped annular portion before the liquid casting material comes in contact with the material of the feeder body. Consequently, an essentially uniform structure is established in the feeder residue on both sides of the feeder opening, so that the feeder residue breaks off in the area of the reduced cross section formed by the feeder opening as the predetermined breaking point.

There is the additional advantage that a re-enforcement is established by the hat-like design of the metallic annular part, so that the annular part has a resulting stability with regard to the stress occurring upon the insertion of the feeder insert. Consequently, the feeder insert with its metallic annu-

lar part may be shaped in such a manner that the cover surface is closely resting upon the surface of the mould, at least by forming only a very thin sand layer. Furthermore, the use of a rigid form mandrel instead of the frequently used spring mandrel is possible.

There is the further advantage that, due to its design, the annular part is prevented from falling off the feeder insert. Independently of how close the cover surface of the annular part rests near the surface of the mould, a sand layer is formed over the height of the crown between the surface of the mould and on the collar fixed to the bottom surface of the feeder insert of the annular portion which in the area of the crown forms a support for the crown or the bottom surface of the feeder body, respectively, so that in any case the annular part does not fall into the mould cavity of the model.

A practical example of the invention involves the formation of an upright bridge at the outer edge of the collar which engages the feeder body on its outer surface in a pot-like manner. Alternatively, but also additionally, there can be provided on the collar of the annular part an upright bridge which projects into the feeder volume of the feeder body and supports the inner surface of the feeder body which includes the feeder volume. With both embodiments, the bottom surface or the lower range of the feeder body, respectively, is provided with stability where each upright bridge supports the rim area of the feeder body which stands upon the annular part. This also avoids breaking of the lower part of the feeder body in the area of its bottom surface upon the action of the mould pressure, so that it is made sure that no feeder material gets into the cast piece.

The drawing shows working examples of the invention which are described below in detail:

Fig. 1 shows a feeder insert sitting upon a forming mandrel held on one model surface,

Fig. 2 shows the article of Figure 1 with additional support bridges.

As it is first shown in Figure 1, the feeder insert 10 has a feeder body 11 which comprises a wall area 13 surrounding a feeder volume 14, and a cover 12. The feeder body 11 has an outer surface 16 and an inner surface 15 of the wall area 13 surrounding the feeder volume 14, and a bottom surface 17.

In the representation of Figure 1, there is a shaping mandrel 19 designed as spring mandrel on a mould surface 18, onto which the feeder insert 10 is put up.

On the lower side of the feeder insert and connected to the bottom surface 17, preferably by adhesion, there is a metallic annular part 20 which has a hat-like shape. The hat-shaped annular part 20 is preferably adhered by a circumferential collar 21 to the bottom surface 17 of the feeder body 11, and projects in the direction of the mould surface 18 with a crown 22. In the cover surface 23 enclosing the annular part 20, a feeder opening 24 is formed.

Figure 1 shows the position of the feeder insert 10 placed upon the shaping mandrel 19 before the addition of the mould sand, so that, during the subsequent moulding process, the distance 30 between the cover surface 23 of the annular part 20 and the mould surface 18 is reduced. In any case, during moulding, the space 31 between the collar 21 and the mould is filled with sand, so that in this area, i.e. around the crown 22, a sand cushion is formed which holds the collar 21 of the

annular part 20 against the bottom surface 17 of the feeder body 11.

The working example shown in Figure 2 differs from the working example of Figure 1 only in that, for improving the contact surface between the feeder body 11 and the collar 21 of the annular part 20, there is provided a pot-shaped encircling upright bridge 25 surrounding the outer surface 16 of the feeder body 11, whereas, on the inside, an additional upright bridge 26 is provided which projects into the feeder volume 14 and supports the inner surface 15 of the feeder body 11. The two bridges 25, 26 may be provided individually or in combination, and they are responsible that upon application of the moulding pressure the feeder body 11 does not break in the area standing on the annular part 20.

The features of the subject matter of these documents as disclosed in the above description, the claims and the drawings may be important both individually and in any combination for the realization of the invention in its different embodiments.

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Claims

1. Feeder insert to be inserted into a casting mould used for casting metals, consisting of a feeder body made of an exothermic and/or insulating material comprising a feeder volume, a metallic annular part being attached to its lower bottom surface facing the mould area forming the cast piece, which itself forms a feeder opening adapted to provide a predetermined breaking point for a feeder residue being formed in the feeder volume, characterized in that the annular part (20) has a hat-shaped form with a collar (21) connected to the bottom surface (17) of the feeder body (11), and a cover surface (23) projecting over a crown (22) to the mould surface (18) and comprising the feeder opening (24).

2. Feeder insert according to claim 1, characterized that on the outer rim of the collar (21) there is provided an upright bridge (25) which encloses the feeder body (11) on its outer surface (16) in a pot-like manner.

3. Feeder insert according to claims 1 or 2, characterized in that, on the collar (21) of the annular part (20), an upright bridge (26) is formed which projects into the feeder volume (15) of the feeder body (11) and supports the inner surface (15) enclosing the feeder volume (14) of the feeder body (11).

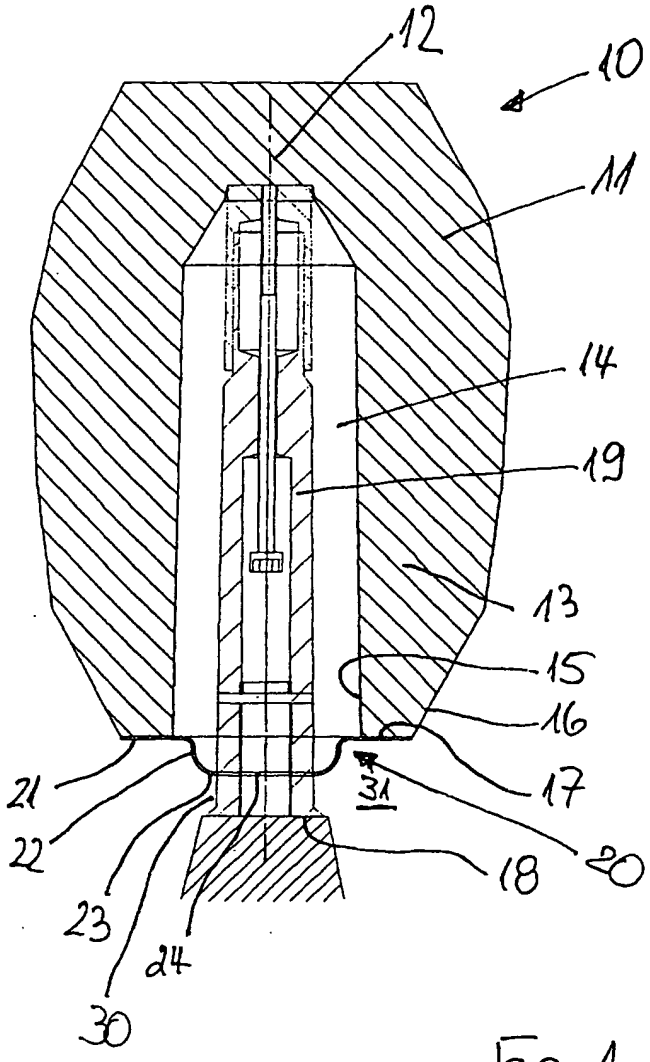

Fig. 1

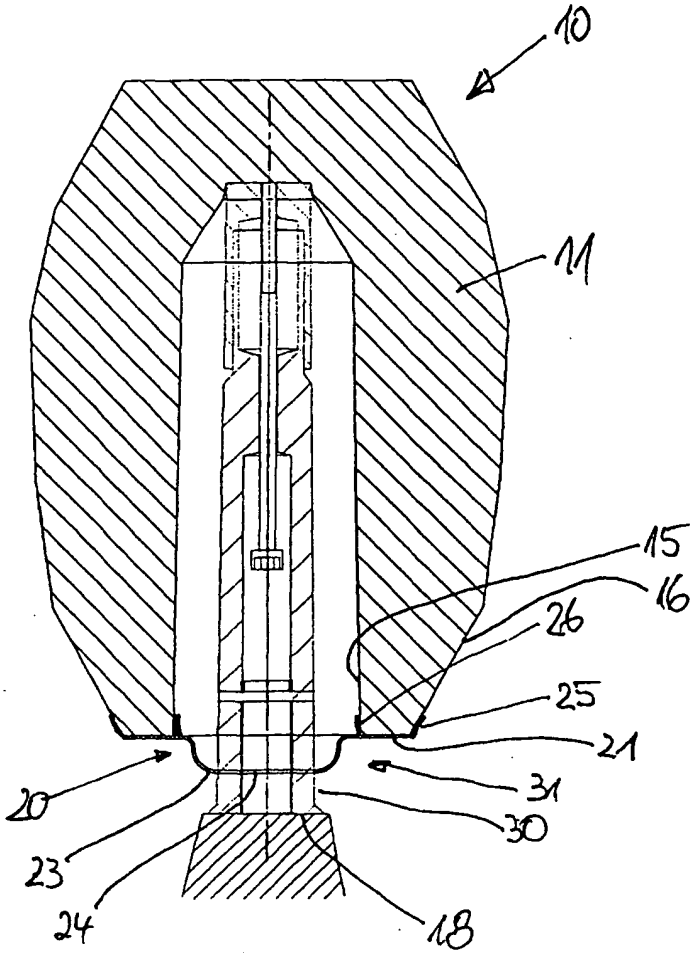

Fig. 2